



RESEARCH ARTICLE

A STUDY OF PREVALENCE OF HYPERURICEMIA IN HYPERTENSION

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INTRODUCTION

In recent years, a large body of evidence suggests that hyperuricemia may play a role in the development and pathogenesis of a number of metabolic, hemodynamic, and systemic pathologic diseases, including metabolic syndrome. Metabolic syndrome is a major contributor to the development of type 2 diabetes, hypertension, atherosclerosis and other conditions including oxidative stress, mild kidney disease, endothelial dysfunction and chronic inflammation. Among these, Hypertension is one of the leading causes of global burden of disease¹. It is well known that there are various risk factors, those may contribute to the onset of hypertension. Hyperuricemia is gaining importance recently as a marker for hypertension which is being proven by various studies. Early identification of high uric acid level and subsequent measures to reduce uric acid level can reduce the onset of hypertension. This study has been planned to assess the relation between hyperuricemia and hypertension

Aim

To analyse the relation between hyperuricemia and hypertension

MATERIALS AND METHODS

This prospective comparative study was conducted in the Hypertension clinic and Non Communicable Disease clinic of a

ABSTRACT

In recent years, a large body of evidence suggests that hyperuricemia may play a role in the development and pathogenesis of a number of metabolic, hemodynamic, and systemic pathologic diseases, including metabolic syndrome. Among these, Hypertension is one of the leading causes of global burden of disease. Early identification of high uric acid level and subsequent measures to reduce uric acid level can reduce the onset of hypertension. This study was planned to assess the relation between hyperuricemia and hypertension. In our study, 85 patients of new onset hypertension and the same number of patients attending NCD clinic were compared. Serum uric acid was measured in all the patients and data compared and analysed by unpaired t test. The mean value for both sexes was above normal and there was significant association between uric acid and hypertension especially in population of more than 45 years.

Tertiary Care Hospital from October 2014 to April 2015 after obtaining approval from Institutional Ethics Committee. Written informed consent was obtained from the all the patients who were enrolled.

200 newly diagnosed patients with hypertension of all age group were enrolled for the initial screening of the study. After doing thorough general examination, recording Blood pressure and measuring body mass index, patients were subjected to investigations such as random blood sugar, urea, serum creatinine, lipid profile, serum uric acid, ECG and ultrasonogram of abdomen. Patients with BMI>25, dyslipidemia, diabetes, renal failure and gout were excluded from the study.

300 patients from NCD clinic were included as control group. The same general examination, investigations and exclusion criteria were applied to this group also.

Serum uric acid levels of control and study groups were analysed using unpaired t test.

RESULTS

Of the 200 patients enrolled in the study group, 85 cases satisfied the inclusion criteria and were included in the study. In the control group of 300 patients, 85 were selected as per the same criteria and were matched for age and sex. On analysing

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the baseline characteristics of the population included for the study, 54.1% were males and 45.9% were females.

To view the significant prevalence of hypertension in young patients, study group was categorised in to two groups with the age of 45 as demarcation. After categorizing, in the study group of age more than 45, 17(20%)of males and 24(28%) of females were found to have hyperuricemia as shown in figure 1.

Mean value of uric acid in males was 7.041 whereas it was 6.362 in females. The mean in control group was within normal limit for both the sexes (6.089 for males and 5.516 for females) as shown in Table- 1

Table 1 comparison of uric acid levels between control and study groups

Age	sex	Control		Study		P value	Significance (<0.05)
		Mean	SD	Mean	SD		
<45years	Males	6.143	1.1513	6.200	1.524	0.93	Not significant
	Females	5.640	1.443	6.840	1.212	0.19	Not significant
>45years	Males	6.089	1.353	7.041	2.181	0.0241	Significant
	Females	5.516	1.430	6.362	1.488	0.0217	Significant

In the study group less than 45 years of age, mean value of uric acid for males was 6.200 which lies within normal range and the value observed for females was 6.840 (depicted in Figure 1).

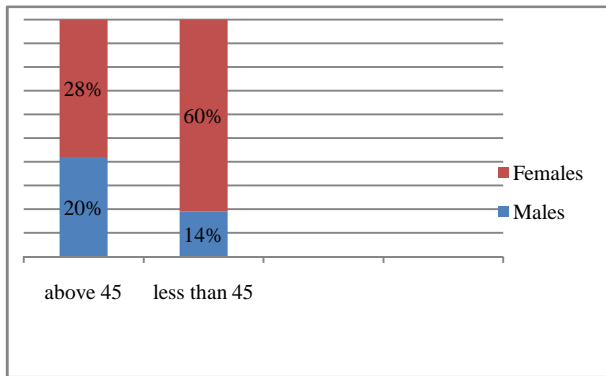


Figure 1 Population with increased uric acid

DISCUSSION

Hypertension is one of the leading causes of global burden of disease. Hypertension doubles the risk of cardiovascular diseases including coronary artery disease, congestive heart failure, ischemic and hemorrhagic stroke, renal failure and peripheral arterial disease.¹ It is well known that obesity, dietary sodium chloride intake, alcohol consumption, psychosocial stress, low level of physical activity and low intake of potassium all play a role in contribution of hypertension.

For many years, presence of elevated uric acid levels known to be present in many hypertensives was considered to reflect pre existing renal disease or increased urate reabsorption by diuretic therapy. However, largely under the impetus of Richard Johnson, Daniel Feig and colleagues, the presence of hyperuricemia is now considered to be precursor and possible pathogenetic factor for hypertension. Hyperuricemia also has been repeatedly shown to predict the incidence of hypertension².

Among all the risk factors, hyperuricemia is gaining importance recently which is proven by various studies.

Hyperuricemia is present in 25 to 50% of individuals with untreated primary hypertension, about five times the frequency found in normotensive persons. Hyperuricemia probably reflects decreased renal blood flow presumably a reflection of nephrosclerosis. Also People with hyperuricemia are at an increased risk for high blood pressure, according to research presented at the American College of Rheumatology Annual Scientific Meeting in Atlanta³.

Nonetheless, proof of the ability to ameliorate hypertension by lowering uric acid levels is only now being tested.

A glimmer of evidence is now available; the lowering of uric acid by allopurinol was associated with lowering of the BP of 30 adolescent hypertensives²

In our study we observed that 52.94% of patients with new onset hypertension had hyperuricemia. Jules Clement Nguedia Assob *et al* in his study showed that 33% of total population had a high (UA) concentration, with 49.5% being hypertensive⁴. Peter Grayson MD, a rheumatologist at the Boston Medical Center *et al* found that 40% of people with high uric acid level develop hypertension⁴.

In this present study, Comparison between control and study groups by applying unpaired t test revealed in males, >45 years p value of 0.0246 which is statistically significant. In females >45 years of age, unpaired t test comparison between the two groups, significance was appreciated by the p value 0.0217. Earl S. Ford *et al* showed in a study published in journal of AHA that serum concentrations of uric acid are strongly associated with the prevalence of the metabolic syndrome and several of its components⁵.

As we compared groups of less than 45 for uric acid, surprisingly, there was no statistical significance (p value 0.93 for males and 0.1923 for females). John P. Forman *et al* in study of Plasma Uric Acid Level and Risk for Incident Hypertension Among Men showed that Plasma UA level was not associated with incident hypertension in older men and the association was observed only among men who were younger than 60 years⁶. Our study showed no significant association in younger men.

Though we have the limitation of small sample size, our study shows that there is a significant increase in the level of uric acid in considerable strength of population of both sexes with new onset hypertension and there is significant association only in persons of age more than 45.

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